AMENDMENTS TO THE CLAIMS

1 (Previously presented.) A method of controlling movement in a dynamic system which can be expressed in terms of both rigid and flexible modes, the method comprising the steps of:

generating a rigid body input for the dynamic system;

processing the rigid body input so as to produce a processed input which compensates for vibrations in the flexible mode of the system; and

applying the processed input to control the dynamic system, wherein the generating step comprises (i) creating a model of the rigid mode of the dynamic system based on a modal analysis, and (ii) determining the rigid body input based on the modal analysis, wherein the rigid body input is determined in accordance with a feedback signal; and

wherein the method further comprises adding a quasi-static correction factor to the feedback signal, the quasi-static correction factor correcting for a deflection in the component during movement.

2 (Canceled)

3 (Original) A method according to Claim **1**, wherein the rigid body input corresponds to a fundamental limiting parameter of the system, the fundamental limiting parameter of the system comprising a first parameter of the system to enter into saturation

4 (Original) A method according to Claim **3**, wherein the processing step processes the rigid body input in accordance with a system vibration limiting constraint and a system sensitivity constraint.

5 (Original) A method according to Claim **4**, wherein the system vibration limiting and sensitivity constraints reduce vibration during movement of a component of the dynamic system by less than 100%.

6 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input in accordance with one or more constraints that are a function of a movement distance of a component of the dynamic system.

7 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input in accordance with a system vibration limiting constraint only.

8 (Original) A method according to Claim **1**, wherein the processing step shapes the rigid body input using a predetermined shaping function.

9 (Original) A method according to Claim **8**, wherein the rigid body input includes both transient portions and a steady state portion; and

wherein only the transient portions of the rigid body input are shaped in accordance with the predetermined shaping function.

10 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input by filtering the input using filters having zeros which are substantially near poles of the system.

11 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input in accordance with at least one of constraints relating to system thermal limits, system current limits, and system duty cycle.

12 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input by determining a movement distance of a component of the dynamic system and modifying the rigid body input based on the movement distance.

13 (Original) A method according to Claim **1**, wherein the rigid body input comprises a Posicast input.

14 (Original) A method according to Claim **1**, wherein the rigid body input comprises a symmetric input.

15 (Original) A method according to Claim **1**, wherein the processing step processes the rigid body input in accordance with a symmetric constraint that varies as a function of at least one of time and position of a component of the dynamic system.

16 (Original) A method according to Claim **1**, wherein the rigid body input comprises a voltage which has been controlled by controlling current.

17 (Currently Amended) A method according to any one of Claims **1** and **3** to **16**, wherein the processing step comprises:
identifying system parameters in real-time; and
modifying the rigid body input in real-time in accordance with the system parameters identified in the identifying step.

18 (Currently Amended) A method according to Claim [[**2**]] **1**, wherein the determining step determines the rigid body input in accordance with an insensitivity constraint

19 (Currently Amended) A method according to Claim [[**2**]] **1**, wherein the model of the system comprises a plurality of equations for the system; and
wherein an insensitivity constraint for a particular system parameter is added to the system by taking a derivative of a system equation with respect to the insensitivity constraint and setting the derivative equal to zero

20 (Currently Amended) A method according to Claim [[**2**]] **1**, wherein the model of the system comprises a plurality of equations for the system; and
wherein an insensitivity constraint for a particular system parameter is added to the system by setting a series of constraints for different values of the system parameter so as to limit a variation in the system parameter.

21 (Canceled.)

22 (Currently Amended) A method according to Claim [[**2**]] **1**, further comprising determining a center of mass of a component of the dynamic system;
wherein the rigid body input is determined in accordance with a feedback signal based on the

center of mass of the component.

23 – 32 (Canceled)

33 (Previously Presented.) An apparatus which controls a dynamic system that can be expressed in terms of both rigid and flexible modes, the apparatus comprising:

a memory which stores computer-executable process steps; and

a processor which executes the process steps stored the memory so as (i) to generate a rigid body input for the dynamic system, (ii) to process the rigid body input so as to produce a processed input which compensates for vibrations in the flexible mode of the system, and (iii) to apply the processed input to control the dynamic system, wherein the processor generates the rigid body input by (i) creating a model of the rigid mode of the dynamic system based on a modal analysis of the system, and (ii) determining an input to the dynamic system based on the modal analysis, and wherein the rigid body input is determined in accordance with a feedback signal and wherein a quasi-static correction factor is added to the feedback signal, the quasi-static correction factor correcting for a deflection in the component during movement.

34 – 37 (Canceled)

38 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input in accordance with one or more constraints that are a function of a movement distance of a component of the dynamic system.

39 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input in accordance with a system vibration limiting constraint only.

40 (Original) An apparatus according to Claim **33**, wherein the processor shapes the rigid body input using a predetermined shaping function.

41 (Original) An apparatus according to Claim **40**, wherein the rigid body input includes both transient portions and a steady state portion; and

wherein the processor shapes only the transient portions of the rigid body input in accordance with the predetermined shaping function.

42 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input by filtering the input using filters having zeros which are substantially near poles of the system.

43 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input by filtering the input using filters having zeros which are substantially near poles of the system.

44 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input by determining a movement distance of a component of the dynamic system and modifying the input based on the movement distance

45 (Original) An apparatus according to Claim **33**, wherein the rigid body input comprises a Posicast input.

46 (Original) An apparatus according to Claim **33**, wherein the rigid body input comprises a symmetric input.

47 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input in accordance with a symmetric constraint that varies as a function of at least one of time and position of a component of the dynamic system.

48 (Original) An apparatus according to Claim **33**, wherein the processor processes the rigid body input based on a voltage which has been controlled by controlling current.

49 (Currently Amended) An apparatus according to any one of Claims **33** <u>and **38**</u> to **48**, wherein the processor processes the rigid body input by (i) identifying system parameters in real-time, and (ii) modifying the input in real-time in accordance with the system parameters identified by the processor.

50 (Original) An apparatus according to Claim **33**, wherein the processor generates the rigid body input in accordance with an insensitivity constraint.

51 (Original) An apparatus according to Claim **50**, wherein the model of the system comprises a plurality of equations for the system; and
wherein an insensitivity constraint for a particular system parameter is added to the system by taking a derivative of a system equation with respect to the insensitivity constraint and setting the derivative equal to zero.

52 (Original) An apparatus according to Claim **50**, wherein the model of the system comprises a plurality of equations for the system; and
wherein an insensitivity constraint for a particular system parameter is added to the system by setting a series of constraints for different values of the system parameter so as to limit a variation in the system parameter.

53 (Original) An apparatus according to Claim **33**, wherein the processor generates the rigid body input in accordance with a feedback signal; and
wherein the processor adds a quasi-static correction factor to the feedback signal, the quasi-static correction factor correcting for a deflection in the component during movement.

54 (Original) An apparatus according to Claim **33**, wherein the processor determines a center of mass of a component of the dynamic system; and
wherein the processor generates the rigid body input in accordance with a feedback signal based on the center of mass of the component.

55 – 102 (Canceled)